Higher National Unit Specification

General information for centres

Unit title: CAD: Systems Management

Unit code: DW1A 35

Unit purpose: This Unit is designed to introduce candidates to customising a CAD system. The Unit allows candidates to develop the necessary knowledge and skills to allow them to increase draughting productivity using customising techniques.

On completion of the Unit the candidate should be able to:

1   Identify CAD management options.
2   Customise the user interface.
3   Create and use slides.
4   Create and use linetypes and hatch patterns.
5   Create and use menus.
6   Create and use customised toolbars.

Credit points and level: 2 HN Credits at SCQF level 8: (8 SCQF credit points at SCQF level 8*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Access is at the discretion of the centre. However, candidates should possess a basic knowledge and understanding of 2D draughting techniques. This may be evidenced by possession of HN Units in Computer Aided Draughting and/or a Higher in Graphical Communication (or equivalent).

Core Skills: There are opportunities to develop the core skills of Information Technology, Problem Solving and Communication at SCQF level 6 in this Unit, although there is no automatic certification of core skills or core skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes. The Unit may be linked/integrated with the following Units: Computer Aided Draughting and Design: Graded Unit 1; CAD: User Systems.

General information for centres (cont)

Assessment: Outcome 1 should provide a balance of short answer, restricted response and structured questions. The remaining assessments for Outcomes 2, 3, 4, 5, and 6 in this Unit should be practical ie the completion of a checklist and/or a printable/plottable drawing. All assessments should be conducted under controlled, supervised conditions.

For Outcome 1, it is important to recognise that CAD is rarely used as an out-of the-box application. Candidates will be able to identify not only the range opportunities for customisation but understand the need to manage and standardise these changes. The Outcome 1 assessment should last no longer than one hour.

In Outcome 2 the candidate will be required to customise the user interface. A minimum of 12 customised changes should be sampled reflecting the candidate's chosen industry or discipline. A combination of screen dumps and checklist should be used to ensure the candidate has achieved all elements of the Outcome, which should last for one hour maximum.

Outcome 3 involves creating slide files for use in CAD. Part a) of the Outcome requires candidates to create and display a minimum of 12 slides for an animation or presentation, including the text file to display the slide show. This part of the Outcome should last for two hours. Part b) of the Outcome is to create and display slides as part of a menu system and the assessment of this element should be integrated with Outcomes 4, 5 and 6.

While Outcomes 3b, 4, 5 and 6 can be assessed as separate assessments, they may be integrated into a single assignment. If integrated, the assignment should involve a 'theme' in which the candidate creates line types, hatch patterns, slides, a customised menu and custom toolbar. These customisations should be used practically to create at least one drawing illustrating their use. The assignment should be completed in 14 hours. Candidates should be allowed to refer to relevant course material. This assignment should be carried out at the end of the delivery of the Unit.

It should be noted that candidates must achieve all the minimum evidence specified for each Outcome in order to pass the Unit.

It is essential that the Centres ensure that evidence generated is the candidate's own work. It is recommended that if an integrated assignment is used for Outcomes 3b, 4, 5 and 6 that the candidate could create their own 'theme' which relates to their chosen industry.

An assessment exemplar is available for this Unit.

Higher National Unit specification: statement of standards

Unit title: CAD: Systems Management

Unit code: DW1A 35

The sections of the Unit stating the Outcomes, knowledge and/or skills, and evidence requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Identify CAD management options

Knowledge and/or skills

- Types of customisation
- In-house vs. third party customisation
- Advantages and disadvantages of customisation
- Role of a CAD Manager
- CAD standards

Evidence Requirements

Evidence for the knowledge and/or skills in this outcome will be provided by a suitable balance of short answer, restricted response and structured questions.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Assessment should be conducted under open book conditions.

Assessment guidelines

The assessment should take the form of one assessment paper consisting of a suitable balance of short answer, restricted response and structured questions. Candidates should be able to recognise that CAD is rarely used as an out-of the-box application and will therefore be able to identify the range of opportunities for customisation.

Assessment should be carried out after the topic has been taught. The time allocation for the assessment should be no more than one hour.

Higher National Unit specification: statement of standards (cont)

Unit title: CAD: Systems Management

Outcome 2

Customise the user interface

Knowledge and/or skills

- Draughting aids
- System options
- System variables
- Screen layout
- Input devices

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis using a minimum of four from five topics listed demonstrating that the candidate can create a minimum of 12 customised changes. A candidate's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements of the sample by showing that the candidate is able to customise features such as:

- drawing aids to user-requirements
- system options to user-requirements
- system variables to user-requirements
- screen layout
- mouse functions
- keyboard command aliases and short cut keys
- start up switches

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Candidates may refer to textbooks, handouts or notes for this assessment.

Assessment guidelines

The assessment for this Outcome should take the form of a practical demonstration.

The assessment should be carried out after the topic has been taught. The time allocation for the assessment should be no more than one hour. It is recommended that Centres develop checklists to support the assessment requirements for each of the knowledge and/or skills items.

Higher National Unit specification: statement of standards (cont)

Unit title: CAD: Systems Management

Outcome 3

Create and use slides

Knowledge and/or skills

- Slide creation and display
- Slide show for presentation/animation
- Slides containing user-defined blocks
- Slides containing user-defined hatch patterns

Evidence Requirements

The assessment for this Outcome will not probably be completed at a single event. For part a) of the assessment candidates should create and display a minimum of 12 slides for an animation or presentation also including a text file to display the slide show. Part b) of the Outcome combines with Outcomes 4, 5 and 6 to form a single assignment.

For this Outcome part of the assignment, a candidate's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for each item by showing that the candidate is able to:

Part a)
- create and display slides for a presentation/animation
- write a text file to display a slide show

Part b)
- create and display slides containing user-defined blocks and hatch patterns

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Assessment should be conducted under closed-book conditions and as such candidates must not be allowed access to textbooks, handouts or notes.

Assessment guidelines

If integrated with Outcomes 4, 5 and 6, the Outcome may not be able to be fully assessed at this stage, but candidates should be advised that they have met the required criteria for the Outcome. The assessment for this outcome should take the form of a practical demonstration, whereby the candidate demonstrates that they have created a series of slides for use with:

- icon menus
- a slide show

The time allocation for the assessment should be no more than two hours. It is recommended that centres develop checklists to support the practical assessment requirements for each of the knowledge and/or skills items as this will assist with assessing the overall integrated assignment.

Higher National Unit specification: statement of standards (cont)

Unit title: CAD: Systems Management

Outcome 4

Create and use linetypes and hatch patterns

Knowledge and/or Skills

- Simple linetypes containing dashes, dots and spaces
- Complex linetypes containing text
- Complex linetypes containing shapes
- Multiple linetypes with more than two elements
- Hatch patterns containing horizontal and vertical elements

Evidence Requirements

The practical assessment for this Outcome should be combined with that from Outcomes 3b, 5 and 6 to form a single assignment. The assignment will not probably be completed at a single event. The time for the complete assignment should be no longer than 14 hours.

For this Outcome part of the assignment, a candidate's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for each item by showing that the candidate is able to:

- create and use a minimum of three simple linetypes
- create and use a minimum of two complex linetypes with text and/or shapes
- create and use a minimum of two multiple linetypes which should contain one created simple line type and one created complex linetype
- create and use a minimum of three hatch patterns consisting of horizontal and vertical elements

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Candidates may refer to textbooks, handouts or notes for this assessment.

Assessment Guidelines

The assessment for this Outcome is practical and if integrated with Outcomes 3b, 5 and 6 may not be able to be fully assessed at this stage, but candidates should be advised that they have met the required criteria for the Outcome. It is recommended that centres develop checklists to support the practical assessment requirements for each of the knowledge and/or skills items as this will assist with assessing the overall integrated assignment.

Outcome 5

Create and use menus

Knowledge and/or Skills

- Screen menu items
- Menu items containing user-defined blocks
- Menu items containing user-defined hatch patterns

Higher National Unit specification: statement of standards (cont)

Unit title: CAD: Systems Management

Evidence Requirements

A candidate's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for each item by showing that the candidate is able to:

- create and use screen menu items containing a minimum of:
  — six pull-down effects for drawing, modifying, systems and other user-defined requirements
  — two cascade effects within the pull-down effects

- create and use menu items containing:
  — six user-defined blocks activated:
    – three from the pull-down effect
    – three from slide icons
  — two user-defined hatch pattern slide icons

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Candidates may refer to textbooks, handouts or notes for this assessment.

Assessment Guidelines

The assessment for this Outcome is practical and if integrated with Outcomes 3b, 4 and 6 may not be able to be fully assessed at this stage, but candidates should be advised that they have met the required criteria for the Outcome. It is recommended that centres develop checklists to support the practical assessment requirements for each of the knowledge and/or skills items as this will assist with assessing the overall integrated assignment. The maximum time for the integrated assessment is recommended as 14 hours.

Outcome 6

Create and use customised toolbars

Knowledge and/or Skills

- User-defined toolbar
- Commonly used icon commands
- Flyout icon
- User-defined icon button

Evidence Requirements

A candidate's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for each item by showing that the candidate is able to:

- Create a toolbar(s) with a minimum of twelve icons for:
  — draw commands
  — modify commands
  — view commands
  — system commands

Higher National Unit specification: statement of standards (cont)

Unit title: CAD: Systems Management

- ◆ Create a flyout icon for a user-defined purpose.
- ◆ Create a user-designed icon button for a specific purpose.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Candidates may refer to textbooks, handouts or notes for this assessment.

Assessment Guidelines

The assessment for this Outcome is practical and if integrated with Outcomes 3b, 4 and 5 may not be able to be fully assessed until this stage, but candidates should be advised that they have met the required criteria for the Outcome. It is recommended that centres develop checklists to support the practical assessment requirements for each of the knowledge and/or skills items as this will assist with assessing the overall integrated assignment. The maximum time for the integrated assessment is recommended as 14 hours.

The assessment for this Outcome should take the form of a practical demonstration, whereby the candidate demonstrates that they have created (and can use) a toolbar with icons. A screen dump of the created toolbar(s) is recommended. It is recommended that centres develop checklists to support the assessment requirements for each of the knowledge and/or skills items.

Administrative Information

Unit code:　　　　　　　DW1A 35

Unit title:　　　　　　　CAD: Systems Management

Superclass category:　　CH

Date of publication:　　August 2006

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History of changes:

Version	Description of change	Date
02	Superclass changed from CD to CH.	26/06/13

Source:　　　　　　　　SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: CAD: Systems Management

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 80 hours.

Guidance on the content and context for this Unit

This Unit has been written in order to allow candidates to develop knowledge, understanding and skills in the following areas:

1   Identify CAD management options
2   Customise the user interface
3   Create and use slides
4   Create and use linetypes and hatch patterns
5   Create and use menus
6   Create and use customised toolbars

This Unit is at SCQF level 8 and has been devised as an Optional Unit within the HNC Computer Aided Draughting and Design award. However this does not preclude the use of the Unit in other awards where award designers feel this to be appropriate.

In designing this Unit, the Unit writer has identified the range of topics that would be expected to be covered by lecturers. The writer has also given recommendations as to how much time should be spent on each outcome assessment. This has been done as a guide to help lecturers decide what depth of treatment should be given to the topics attached to each of the Outcomes. Whilst it is not mandatory for centres to use this list of topics, it should be noted that the assessment exemplar pack for this Unit is based on the knowledge and/or skills and list of topics in each of the Outcomes.

A list of topics for each Outcome is given below. Lecturers are advised to study this list in conjunction with the assessment exemplar pack so that they can get a clear indication of the standard of achievement expected of candidates in this Unit.

Outcome 1

CAD management options (4 hours)

The following topics are generic in nature but should be put into context by reference to both the CAD software application package being used at the Centre and the candidate's chosen industry or discipline:

◆   Types of customisation. Candidates should be able to recognise that CAD is rarely used as an out-of the-box application and should be aware of the range of customisation options.
—   Software options eg settings, variables and switches
—   Standard Features eg Templates, Block library, Parts library, Symbol library

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Unit title: CAD: Systems Management

> — Additional Features eg Linetypes, Hatch Patterns, Shapes
> — Screen Options eg Pulldown menus, Toolbars, Screen menus, Digitiser menu, Keyboard
> — Languages eg Macros, Internal Languages (AutoLISP), External languages (Visual Basic)

◆ In-house vs. third party customisation. The contrast of developing a CAD system in-house as an individual (CAD manager) or as a team, with or without external consultants, versus sourcing and buying additional customised elements, such as symbol libraries, utilities, freeware or bolt-on programs.

◆ Advantages and disadvantages of customisation. Both strategies (in-house and third party) have their merits and drawbacks which candidates should be able to identify and discuss.

◆ Role of a CAD Manager.

◆ Candidates should understand that the management and implementation of any customisation is not only about improving productivity. For example, who decides the level and type of customisation required? Who controls, implements and maintains any customisation? Who is the link to vendors, suppliers, management, contractors, project engineers, consultants? The CAD manager must coordinate these activities to ensure that these changes are robust, portable, and maintainable throughout the organisation.

◆ CAD standards. A benchmark that provides uniformity and quality control to the design and CAD environment. CAD standards control many of the options for customisation to provide a National, company or project format for drawings and design data. Candidates should be familiar with the need for CAD standards as well as their content eg drawing formats, layers, linetypes, menus, libraries, etc.

It may be possible to provide a practical demonstration of controlling CAD standards using appropriate software tools.

Outcome 2

Customise the user interface (5 hours)

The following topics aim to be generic in nature but should be put into context by reference to both the CAD software application package being used at the Centre and the candidate's chosen industry or discipline: These may include;

◆ Drawing aids to user-requirements
> — eg units, precision, object reference
◆ System options to user-requirements
> — automatic save times, automatic save location, back up controls, window elements, error messages, etc
◆ System variables to user-requirements
> — eg dialogue box control, polyline editing, expert variable, dimension variables
◆ Screen layout
> — toolbar options, command line, block manager, tool palettes
◆ Mouse functions
> — button options, wheel settings

Higher National Unit specification: support notes (cont)

Unit title: CAD: Systems Management

- ◆   Keyboard command aliases and short cut keys
    - —   create and edit short cut keys and command functions
- ◆   Start up switches
    - —   automatically load - project files, personal profiles, template drawings, script files

Outcome 3

Create and use linetypes and hatch patterns (22 hours)

The following topics are generic in nature but should be put into context by reference to the CAD software application package being used at the Centre:

- ◆   Three simple linetypes with different combinations of dashes, dots and spaces. These must differ from the linetypes available in the CAD software being used at the Centre.
- ◆   Two complex linetypes having a different item of text or shapes included in their definition.
- ◆   Two multiple linetypes of more than two elements. One of these multiple linetypes should include a user created simple linetype and the other should include a user created complex linetype. It is recommended that no more than four elements be included in the multiple linetype definition and that colour effects and end definitions are included.
- ◆   Three hatch patterns consisting of only horizontal and vertical elements. One of the hatch patterns should have an offset effect. No inclined lines should be included in the hatch pattern definition.
- ◆   Slides require to be created of the created hatch patterns for the slide menu effect.
- ◆   Save the created linetypes and hatch patterns with suitable names in a user accessible file/folder.
- ◆   Recall the saved linetypes and hatch patterns as and when required.

Outcome 4

Create and use slides (10 hours)

The following topics are generic in nature but should be put into context by reference to the CAD software application package being used at the Centre:

- ◆   Create and view slides.
- ◆   Create slides of user-defined blocks.
- ◆   Create slides of user-defined hatch patterns.
- ◆   Create slides for a presentation/animation.
- ◆   Create a slide show using a user written text file. A minimum of twelve slides should be included in the presentation/animation.
- ◆   Save slides with suitable names in a user accessible file/folder.

Higher National Unit specification: support notes (cont)

Unit title: CAD: Systems Management

Outcome 5

Create and use menus (15 hours)

The following topics are generic in nature but should be put into context by reference to the CAD software application package being used at the Centre:

◆ Create a customised menu with a minimum of six selections from a menu bar allowing the user access to:
  — drawing commands
  — modifying commands
  — system commands
  — other commands for user-specific operations
◆ Two cascade menu effects for specific usage.
◆ Access to six user-defined blocks activated:
  — three from the pull-down menu
  — three from slide icons in a user-defined dialogue box
◆ Access to two user created hatch patterns activated from slide icons contained within a user-defined dialogue box.
◆ Save the created menu with a suitable name in a user accessible folder.
◆ Load the created menu as and when required.

Outcome 6

Create and use customised toolbars (6 hours)

The following topics are generic in nature but should be put into context by reference to the CAD software application package being used at the Centre:

◆ Create and customise a toolbar(s) with icons selection for:
  — drawing objects
  — modifying objects
  — viewing objects eg zoom
  — system usage eg saving, opening, printing
◆ Create a fly-out icon for a specific purpose eg dimensioning.
◆ Create a user-designed image on an icon button for a specific purpose eg adding text, viewing etc.

Unit Assessment

Outcome 1	Written	1 hour maximum
Outcome 2	Practical	1 hour maximum
Outcome 3a	Practical	2 hours maximum
Outcome 3b, 4, 5, 6 (integrated assignment)	Practical	14 hours

Higher National Unit specification: support notes (cont)

Unit title: CAD: Systems Management

Guidance on the delivery and assessment of this Unit

It is intended that this Unit is presented at all times using the specialist application CAD software available at the Centre. Appropriate technical and support material should be available to the candidate.

In the delivery of this Unit, candidates should be provided with the opportunity to gain as much 'hands on' experience as possible. Each candidate should have access to a PC with the CAD software installed. Candidates should NOT work in groups.

Details on approaches to assessment are given under Evidence Requirements and Assessment Guidelines under each Outcome in the Higher National Unit specification: Statement of Standards section. It is recommended that these sections be read carefully before proceeding with assessment of candidates.

Opportunities for developing Core Skills

There is naturally occurring evidence that the specific skills elements for Information Technology are developed to an advanced level as candidates undertake the unit and become competent in CAD systems management in a working context. Candidates are required to demonstrate that they are able to customise, create and use slides, lines types, hatch patterns, menus and customised toolbars. Consideration for other users and an adherence to practices and procedures impacting on security and safety would be a routine aspect of good practice.

All elements of the core skill of Problem Solving, that is, planning, organising, critical thinking, and reviewing and evaluating, will be fully developed and enhanced in the unit which applies theoretical knowledge to a range of practical tasks. Identifying and assessing the relevance of all factors, identifying and maximising all available resources involves a high level of critical thinking. Justifying and adopting effective strategies which allow on-going opportunities for review and potential adjustment should reflect and apply current systems management theory and practice. Although a checklist approach to Problem Solving is not particularly useful for the level of skill involved candidates may benefit from personal interviews with the assessor to reinforce analytical evaluative approaches which may inform any future activities and further development.

Although skills in written communication are not formally assessed, candidates should be expected to be able to analyse and summarise complex information effectively. Essential ideas, and information should be expressed coherently, using formal language and structure appropriate to professional standards. Spelling, punctuation and syntax should be accurate.

Open learning

This Unit could be delivered by distance learning, which may incorporate some degree of on-line support. The candidate would require access to a PC with the appropriate CAD software installed. With regard to assessment, planning would be required by the centre concerned to ensure the sufficiency and authenticity of candidate evidence. Arrangements would be required to be put into place to ensure that written assessment was conducted under controlled, supervised conditions.

Higher National Unit specification: support notes (cont)

Unit title: CAD: Systems Management

Arrangements would also need to be made to ensure that the candidate could demonstrate that the practical assessment evidence is their own work. This could involve the candidate attending the centre, utilising video conferencing or alternatively, special arrangements could be made for the candidate to demonstrate the practical assessments to a designated, responsible person local to the candidate.

For information on normal open learning arrangements, please refer to the SQA guide.

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Alternative Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs,* which is available on SQA's website: **www.sqa.org.uk**.

General information for candidates

Unit title: CAD: Systems Management

This Unit has been designed to provide you with the knowledge and skills that will enable you to understand the basic concepts of customising a CAD system to improve draughting productivity.

You will understand the range of CAD management options and learn how to customise the user-interface as well as user defined toolbars and menus.

This Unit will also allow you to develop practical skills that will enable you to create linetypes and hatch patterns as well as user specific menus. The ability to create slides will also be developed and how these slides can be used for presentation purposes and/or an animation. You will also learn how to display user created slides as icons in a dialogue box.

The formal assessment for most of this Unit is Practical; Outcome 1 is the only written assessment.

The actual assessment times are as follows:

Outcome 1	Written	1 hour maximum
Outcome 2	Practical	1 hour maximum
Outcome 3a	Practical	2 hours maximum
Outcome 3b, 4, 5, 6 (integrated assignment)	Practical	14 hours

Your practical skills will be assessed by your being asked to satisfactorily complete certain tasks and you will be given the necessary and appropriate information and/or drawings to complete these assessment tasks.

The Outcome 1, 2 and 3a assessments are normally carried out after the teaching of the appropriate topics while the integrated assignment will not usually be attempted until all teaching has been completed.